PATENT APPLICATION
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# SYSTEM AND MESSAGE FOR INTEGRATED MANAGEMENT OF ELECTRONIC MESSAGES

## Field of the Invention

The invention relates to the field of communications, and more particularly the integrated management of multiple email accounts.

## Background of the Invention

The advent of the Internet has increased the demand for email and other electronic messaging services. Most Internet service providers (ISPs) offer email accounts automatically when a new user is registered. In terms of Internet email transport, the overall client/server protocol employed for transmitting email messages is the Simple Mail Transfer Protocol (SMTP). The host mail server run by the typical ISP includes an SMTP server, which handles email by managing queues and reconciling addresses. Most ISPs offer consumer Internet accounts based on dial-up (PPP) protocols. Under this protocol the consumer client, operating a personal computer or other device, uploads mail to the host email server using SMTP and downloads mail using the Post Office Protocol, presently version 3 (POP3). The typical architecture is illustrated in Fig. 1. POP3 is a low-overhead protocol for general download service, offering the ability to perform basic operations such as listing and deleting email messages.

However, deploying POP3 for email access entails disadvantages. One is that the client's personal computer must be programmed to know the precise address of the root email mailbox, by identifying the IP address of the host mail server. If the account holder's mailbox is moved to a different host mail server at a different IP address, the software on the client's personal computer must be reprogrammed to reflect the new destination. As a result, ISPs are reluctant to move account holder mailboxes, and can only do so with great attention. This limits the flexibility of ISPs in deploying new mail hosting technologies, including to change or upgrade mail servers.

Another disadvantage of the POP3 architecture is that if an account holder chooses to change ISPs entirely, there is in general no mechanism to transfer the account holder's email mailbox to the new service provider, intact. There is, moreover, no provision for the coexistence of two mailboxes with the same account name but different mail server hosts. Thus, a consumer who has changed ISPs must periodically check both the old email mailbox and the new mailbox until the transition is complete. Similarly, when an account holder maintains both a business email address and a personal email address, they must access each of those mailboxes separately.

Moreover, on the server side, ISPs need to maintain their host mail servers with modules to register and process billing information, account statistics and other value-added services. There are no industry standards for those mail server services, and they vary from one ISP to the next. Consequently, individual ISPs are effectively locked into a single vendor's package to maintain attendant services at the level of the mail server, or be forced to write conversion software when a new service package is introduced, so as not to disrupt the addressing scheme for their customers. Other problems exist.

**Summary of the Invention**

The invention overcoming these and other problems in the art relates to an integrated message management system and method, including a proxy server, which mediates the delivery of messages between a client workstation and multiple POP3 email servers. The proxy server communicates with the client workstation using the POP3 protocol, and maintains an associated mail registration database. The mail registration database contains entries for all of the user's email accounts, their IP addresses and associated ISP entities.

When the user wants to access their mail, the proxy server distributes mail update requests to one or more of the POP servers belonging to the user. Localizing and integrating all of the user's account addressing and other

information within the dedicated proxy server relieves the user and the network service provider from needing to reprogram clients and servers every time a new email account is shifted, added or deleted. Among other advantages, this permits relatively painless and transparent migration and the coexistence of multiple mailboxes. The invention affords greater latitude in the movement of an email mailbox amongst mailbox servers of different types, as well.

From the server point of view, the invention also allows the ISP to both deploy a common interface to the client workstation as a front-end manager, as well as permit a unified interface for server-side administrative packages.

## Brief Description of the Drawings

The invention will be described with respect to the accompanying drawings, in which like elements are indicated by like numbers.

Fig. 1 illustrates an email architecture according to conventional delivery protocols.

Fig. 2 illustrates a network architecture for integrated message management according to the invention.

Fig. 3 illustrates aspects of a proxy server used in the invention.

Figs. 4 and 5 illustrate a flow chart of message processing according to the invention.

Fig. 6 illustrates an email management process presented to a user according to the invention.

Fig. 7 illustrates a directory structure of a mail registration database according to the invention.

## Detailed Description of The Preferred Embodiments

The invention will be described with respect to an overall messaging architecture illustrated in Fig. 2. As illustrated in Fig. 2, in the network environment of the invention a client workstation 102 communicates via communications link 104 with a proxy server 106. Client workstation 102 may be, for instance, a personal computer running the Windows™ 95, 98 or NT™, Unix, Linux or other operating systems, and communications link 104 may be a dial-up connection, ISDN, DSL, Ethernet, cable modem, T1 or T3, or other wired or wireless digital or analog communications connection. Proxy server 106 may be, for instance, a workstation running the Windows™, NT™, Unix, Linux or other operating systems.

In the illustrative embodiment, the configured protocol between client workstation 102 and proxy server 106 is the Point to Point (PPP) standard, familiar to persons skilled in the art. Proxy server 106 is connected over connection 112 to a mail registration database 108, in which user ID, account number, ISP, Internet addressing and other information is stored. Connection 112 may be configured according to the LDAP or other protocols.

Proxy server 106 is connected via communications link 110 to a plurality of distributed email servers, 114a, 114b . . . 114n (n arbitrary), which host individual email or other messaging accounts. Communications link 110 may be, for instance, a T1 or T3, frame relay, DSL, cable modem, fiber optic, or other wired or wireless, analog or digital, backbone or other connection, including linkage to or through the Internet. Each of the email servers 114a, 114b . . . 114n is attached to a respective local email database 118a, 118b . . . 118n which hosts incoming and outgoing email messages according to the SMTP, MIME or other network protocols.

Each mail server 114a, 114b . . . 114n is connected to its respective email database via corresponding connection 116a, 116b . . . 116n, each of which may be configured according to the Standard Query Language (SQL) Net protocol or others. In general, the proxy server 106 communicates with remote

email servers 114a, 114b . . . 114n using the POP3 scheme, and also communicates with the client workstation 102 using POP3 to identify, retrieve and transmit electronic mail messages.

As illustrated in Fig. 3, proxy server 106 may contain a processing unit 120, memory 122 such as electronic RAM, input/output interface 126 and local storage 128 such as a hard drive, connected over an electronic bus 130, as will be appreciated by persons skilled in the art.

Client applications which service an electronic mailbox using the POP3 standard generally proceed through several predefined states during the course of connecting to an email server. Those states include:

**TABLE 1**

1. Authorization State: The user has not identified themselves to the email server.
2. Transaction State: The user has received authorization to access a mailbox on the email server. The user may issue commands to the email server to list and retrieve messages, and mark selected messages for deletion.
3. Update State: After a user has completed desired retrievals and deletions, the user may issue a quit command, which moves the session to the update state. During this state, the email server deletes any messages that were marked for deletion and terminates the connection to the client.

~~With conventional access packages, for each mailbox that a user wishes~~ to enter, they must go through each of these successive states in serial fashion. While doing so, the user must keep track of the identity and addresses of each of the POP3 email servers to which they need to connect. In the invention, in contrast, and as illustrated in Fig. 5, a user at client workstation 102 connects to and is serviced by proxy server 106 by presentation of interface module 132 on the client workstation 102. The interface module 132 presents an integrated

view into all of the user's available email accounts, regardless of service provider or location. The user may, in general, view a list of all pending email messages, and mark individual messages for download or deletion from interface module 132, without needing to separately access or address each of mail servers 114a, 114b . . .114n. Interface module 132 is in one regard illustrated in Fig. 6.

An illustrative sequence of message processing is shown in Figs. 4 and 5. In step 202, processing begins. In step 204, client workstation 102 connects to proxy server 106. In step 206, proxy server 106 transmits a greeting with a message ID to the client workstation 102. In step 208, client workstation 102 transmits to proxy server 106 an APOP name digest to the proxy server 106, indicating an authorized identity of the user at client workstation 102. In step 210, proxy server 106 performs a look-up of the user's name digest against mail registration database 108.

In step 212, proxy server 106 validates the user's identity, and in step 214 transmits a message to client workstation 102 indicating acceptance of the user's access request over communications link 104. In step 216, proxy server 106 initiates transactions with one or more of mail servers 114a, 114b . . . 114n by establishing a connection to those servers via communications link 110. In step 218, the email servers 114a, 114b . . . 114n respond with a handshake greeting to proxy server 106. In step 220 proxy server 106 transmits to each mail server 114a, 114b . . . 114n user account name information particular to the user's individual account with each service provider, by looking up ID, password and associated information in mail registration database 108. In step 222, email servers 114a, 114b...114n respond with an authorization okay indication to proxy server 106.

After the authorization transactions between proxy server 106 and the distributed email servers 114a, 114b . . . 114n, the proxy server 106 transmits to each of the email servers 114a, 114b...114n a list command to initiate the generation and transmission of a list of pending email messages from each of

the individual servers. In step 226, the email servers 114a, 114b...114n respond and transmit to proxy server 106 a message list of pending email messages using the POP3 protocol.

In step 228, the proxy server 106 consolidates the message list received from each of the email servers 114a, 114b...114n for presentation to the user in consolidated message list 134. In step 230, the user at client workstation 102 transmits a list request to proxy server 106. In step 232, proxy server 106 transmits to the user a list of all pending email messages retrieved from all of the user's accounts, which is presented via interface module 132. In step 234, the user manipulates the interface module 132 using an input device such as a mouse or keyboard to indicate which messages within the consolidated message list 134 are desired to be retrieved.

In step 236, the proxy server 106 receives the retrieve command from the required workstation 102 and maps the selected message numbers to associated email accounts with corresponding email servers among email servers 114a, 114b...114n. In step 238, proxy server 106 transmits to the selected email servers a retrieve command to retrieve the user's selected email messages from the local message storage database 118a, 118b...118n for those servers. In step 240, the selected email servers transmit the indicated messages to the proxy server 106. In step 242, the proxy server 106 maps the return message to the listed consolidated message list number on interface module 132. In step 244, proxy server 106 transmits the selected messages to client workstation 102 using the POP3 protocol.

In step 246, the user at client workstation 102 transmits a delete command to delete selected messages of those presented within the consolidated message list 134, and in step 248 proxy server 106 marks the messages selected for deletion by the user in the consolidated message list 134. In step 250, the proxy server 106 transmits to client workstation 102 an OK signal indicating that deletion has been prepared, after which in step 252 client

workstation 102 transmits to proxy server 106 a quit command indicating the user's desire to terminate the message retrieval session.

Upon receipt of the quit command, the proxy server 106 transmits in step 254 a delete command to individual email servers 114a, 114b...114n hosting the email messages selected for deletion. In step 256, the email servers 114a, 114b...114n receiving the delete command delete the corresponding email messages, and transmit back to proxy server 106 a delete completion signal indicating that the pending messages have been deleted. In step 258, proxy server 106 transmits a quit command to each of the email servers 114a, 114b...114n. After receipt in step 260 each of the email servers 114a, 114b...114n respond with a quit acknowledge flag to the proxy server 106 and terminate the POP3 connection over communications link 110. In step 262, proxy server 106 transmits a session termination message to client workstation 102, causing interface module 132 to indicate the exiting from the message access session. In step 264, processing ends.

Thus, after the proxy server 106 validates a user using their user ID and password against the mail registration database 108, the proxy server 106 obtains the locations and IP addresses of the user's email mailboxes. The mail registration database 108 is illustrated in more detail in Fig. 7. As shown in that figure, the mail registration database contains global registration object 140 containing one or more profile association records 142, which relate a user ID to password, mailbox address and related fields. The proxy server 106 establishes connections to each such mailbox, retrieves a list of pending email messages and presents a consolidated message list 134 to the user on client workstation 102 via interface module 132.

The proxy server 106 then processes any further commands from the client workstation 102, including NOOP, LIST, STAT, DELE, and RSET commands without necessarily interacting with the backend email servers. It is only necessary for the proxy server 106 to interact with the email servers 114a,

114b...114n when the client workstation issues a command to retrieve a message or to quit the messaging session.

Because the proxy server 106 imitates a POP3 mail server from the point of view of the client workstation 102, proxy server 106 can parse the commands and semantics of all the interactions which occur with the client workstation 102 and present an integrated message port. Proxy server 106 may use this ability to intercept commands issued by client workstation 102 to provide further value added services using administrative module 136, associated with and running on proxy server 106.

Administrative module 136 may perform such activities as recording billing information, archives, links, cookie and other information, and logging connection statistics and other information, all on behalf of a single user entering the messaging system of the invention via proxy server 106. Thus, in the practice of the invention an extensible set of service processes may be incorporated in administrative module 136 to make the maintenance, billing and other operational aspects of the overall communication system easier to upgrade, maintain and more reliable for service providers.

The foregoing description of the invention is illustrative, and variations in configuration and implementation will occur to persons skilled in the art. For instance, while the invention has been described with respect to the retrieval of text or email messages, other kinds of message information, such as digitized voice, facsimile, alpha-numeric pages and other information may be accessed and retrieved by the invention.

Similarly, while the invention has been described with respect to a single proxy server 106 which collects and distributes email information, the invention may be carried out using an architecture having more than one proxy server giving multiple access points and connection accounts to the user. Or, the functionality described as being executed on a dedicated proxy server 106 may be distributed to one or other hardware resources, including client

workstation 102, routers, gateways and other devices. The scope of the invention is accordingly intended only to be limited by the following claims.